217 GRANGE AVENUE, MARSDEN PARK

Aboriginal Due Diligence Assessment

PREPARED BY  TORY STENING
REPORT TO  JS ARCHITECTS ON BEHALF OF GRAHAM DEVELOPERS
LGA  BLACKTOWN CITY COUNCIL
VERSION NO  C.2016
DATE  SEPTEMBER 2016
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Graham Developers are proposing to construct three four storey residential apartment buildings at 217 Grange Avenue, Marsden Park.

To ensure that the Aboriginal heritage significance of the study area is not adversely impacted upon by the proposed development, JS Architects on behalf of Graham Developments commissioned Comber Consultants to undertake this Aboriginal Due Diligence Assessment. This assessment has been prepared in accordance with the Office of Environment & Heritage’s (OEH) Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW and the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.

During the site inspection the ground visibility was nil as the area was heavily vegetated and contained a residence with outbuildings. Although the whole of the study area was examined, due to the heavy vegetation, no Aboriginal objects were located during the site inspection. However, previous archaeological work on the Cumberland Plain has indicated that subsurface deposits will still exist despite a lack of surface evidence and even if the ground has been disturbed by agricultural or other development impacts. Therefore, this report makes the following recommendations:

1. Aboriginal consultation should be undertaken in accordance with OEH’s Aboriginal cultural heritage consultation requirements for proponents 2010.

2. Archaeological testing should be undertaken to determine the nature and extent of Aboriginal objects on the subject property. A Research Design which clearly outlines the proposed methodology for the testing will need to be prepared in consultation with the Aboriginal community and submitted to OEH 14 days prior to the testing being undertaken.

3. If no Aboriginal objects are found during the archaeological testing the proposed redevelopment can proceed without an AHIP; or

4. If Aboriginal objects are found during the archaeological testing it will be necessary to apply for an AHIP.
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1.0 INTRODUCTION

BACKGROUND
LOCATION
PROPOSAL
1.0 INTRODUCTION

1.1 Background
Graham Developers are proposing to construct three four storey residential apartment buildings at 217 Grange Avenue, Marsden Park.

To ensure that the Aboriginal heritage significance of the study area is not adversely impacted upon by the proposed development, JS Architects on behalf of Graham Developments commissioned Comber Consultants to undertake this Aboriginal Due Diligence Assessment. This assessment has been prepared in accordance with the Office of Environment & Heritage’s (OEH) Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW and the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales.

1.2 Location
The study area is located at 217 Grange Avenue, Marsden Park, known as Lot 8 Section J DP193074. Marsden Park is located approximately 40km north west of the Sydney Central Business District (CBD) within the Blacktown Local Government Area (LGA). The study area is situated on the southern side of Grange Avenue and is bound to the north by Grange Avenue, to the east by 215 Grange Avenue, to the south by Lot 1 DP 1205982, and to the west by 213 Grange Avenue. Figure 1 below shows the location of Marsden Park. Figure 2 shows the location of the study area on the 1:25,00 topographic map. Figure 3 shows the study area on the 2016 aerial photograph.

Figure 1: Showing the location of Marsden Park highlighted in pink and indicated by the arrow (map courtesy of Google Maps)
Figure 2: Showing the location of the study area outlined in purple and indicated by the arrow (Riverstone 9030-15 1:25,000 Topographic Map).

Figure 3: Showing the study area outlined in red (map courtesy of www.maps.six.nsw.gov.au).
1.3 Proposal

Graham Developers are proposing to subdivide 217 Grange Avenue, Marsden Park and construct three x four-storey residential apartment buildings on the property. Each building will comprise two floors of underground basement car parking. There will also be the construction of several new local roads through the study area to link it to its surrounds. A Masterplan has been approved and the indicative layout of the proposed development is shown in Figure 4 below. More detailed plans are attached at Appendix A.
2.0 METHODOLOGY
2.0 METHODOLOGY

2.1 Methodology
This project was conducted in three stages, being background research, field survey and report preparation, as detailed below.

Stage 1: Background Research
Prior to the field component of this project, a search of the Office of Environment and Heritage’s Aboriginal Heritage Management Information System (AHIMS) of the Office of Environment and Heritage was consulted. A copy of the AHIMS Extensive search is attached at Appendix B. Site data, associated documents and archaeological survey reports held by them were reviewed. Primary and secondary historical research, and environmental research relating to Aboriginal land use was undertaken to allow a history of Aboriginal occupation of the study area to be developed. Such research enabled the potential nature of sites and site patterning in the region, and facilitated the predictive statement. It also provided an archaeological and environmental context to make a significance assessment.

Stage 2: Site Inspection
A site inspection was undertaken on 19 September 2016 with the following people:
- Mr David Nutley, Archaeologist, Comber Consultants;
- Ms Alandra Tasire, Archaeologist, Comber Consultants.

The entire study area was inspected on foot.

Stage 3: Report Preparation
Further archaeological research was conducted where necessary to clarify the results of the survey. This report was then compiled and a draft copy provided to JS Architects.

2.2 Effective Survey Coverage
Ground surface visibility refers to the amount of bare ground visible during the field survey. The visibility of some site types, such as open artefact scatters, is dependent upon ground visibility and exposure. OEH guidelines suggest that this information be presented in a table which quantifies and details the local detectability (OEH Code of Practice 2010:19). However, the entirety of the study area was grassed and there was nil visibility and therefore the table will not be used.
3.0 ENVIRONMENTAL CONTEXT

TOPOGRAPHY
GEOLOGY
STREAM ORDER MODELLING
VEGETATION
CURRENT LAND USE & DISTURBANCE
3.0 ENVIRONMENTAL CONTEXT

3.1 Topography

The study area is located within the central portion of the Cumberland Plain, which is characterised by low, gently undulating slopes with narrow crests and moderately inclined rolling side slopes. The Cumberland Plain covers approximately 600km² and extends to the Blue Mountains to the west, to the Georges River and the headwaters of the Parramatta River in the east, to the Hornsby Plateau on the north to the Woronora Plateau to the south (Stening 2012: 9).

217 Grange Avenue, Marsden Park is a relatively flat area of land sloping gradually from the north western corner down toward the south eastern corner of the property. The property is located approximately 400m to the south west of Bells Creek. It is also located approximately 1.7km to the south west of Eastern Creek and approximately 600m south east of an unnamed tributary of South Creek. The study area lies within the floodplain between South Creek and Eastern Creek.

3.2 Geology

The study area is located on the Wianamatta group of shales, consisting of the Liverpool subgroup. This subgroup consists of a lower formation of Ashfield Shale which grades upwards into a fine sandstone siltstone laminate, culminating in the overlying Minchinbury Sandstone. The Minchinbury Sandstone separates the Ashfield Shale from the overlying Bringelly Shale (Penrith 1:100,000 geological map; Jones & Clark 1991: 17). The Liverpool subgroup does not provide a good variety of lithic materials suitable for stone tool manufacture.

Hawkesbury Sandstone forms the surface of most of the high plateaus surrounding the Cumberland Basin (Sydney 1:250,000 geological map; Jones & Clark 1987: 14). The Hawkesbury Sandstone weathers into overhands and shelters suitable for habitation and protection from the elements. Hawkesbury Sandstone provides materials suitable for the manufacture of ground edge aces and surfaces suitable for engraved art. The Quartz and claystones which weather from the sandstone also provide material for artefact manufacture. Within Hawkesbury Sandstone can be found outcrops of chert, rhyolite, silcrete and tuff. All of these materials are suitable for small tool manufacture. (Comber & Stening 2008: 9)

Silcrete, suitable for the manufacture of stone tools, is found at number outcrops in the Cumberland Plain. Those located nearest to the present study area are at Plumpton, approximately 10km to the south west of the study area; St Clair, approximately 16km to the south; Erskine Park, approximately 16km to the south west of the study area; and Luddenham, approximately 30km to the south west of the study area (Comber & Stening 2008: 9).

3.3 Stream Order Modelling

Stream order can be used to predict Aboriginal land use patterns. Bell Creek would be classified as a second order stream, whilst Eastern and South Creeks would be third order streams. The unnamed tributary of South Creek would be classified as a first order stream.

A first order stream is the smallest and is a small tributary that flows into and feeds larger streams but does not normally have any water flowing into it. The joining of two first order streams creates a second order stream and when two second order streams join they form a third order stream. In addition, first and second order streams generally form on steep slopes and flow quickly until they slow down and meet the next order waterway. First order streams are intermittent (Horton 1945; Strahler 1952).

Modelling undertaken by McDonald and Mitchell (1994) on the Cumberland Plain indicates that stream order can be used to predict areas of archaeological potential. The model hypothesis is that in any particular climate and landscape, a threshold catchment area is necessary to allow permanent stream flow or the establishment of waterholes with extended longevity (i.e. months to years). The critical point where these conditions are met appears to be at the junction of two second or third order streams. Such a location is likely to contain more complex sites with a high density of artefacts, whilst second and third order streams are also likely to contain large sites within 100 metres of the watercourse.

The study area is located between South and Eastern Creeks, two third order streams and adjacent to a first order stream. It could therefore be predicted to contain high archaeological potential.
3.4 Vegetation

The present distribution of vegetation within the Cumberland Plain is a result of human activities. Milling, pastoral/agricultural pursuits and rural residential development have contributed to the reduction in forest density and the replacement of native herbaceous communities with grasses and exotic species.

Benson (1981) and the NSW National Parks and Wildlife Service mapped the vegetation of the Cumberland Plain. Historically the Cumberland Plain would have consisted of tall open forests (wet sclerophyll) with species such as Blaxland’s Stringybark (*Eucalyptus blaxlandii*), Ribbon Gum (*Eucalyptus viminalis*), Brown Barrel (*Eucalyptus fastigata*), Blue Mountains ash (*Eucalyptus oreades*), Blackwood (*Acacia melanoxylon*) and narrow leaved Peppermint (*Eucalyptus radiate* ssp. *Radiate*). It would have included a shrubby undergrowth including *Pittosporum undulatum* and *Hakea salicifolia*, ferns and climbers (Benson and Keith 1990).

The original vegetation of the Cumberland Plain would have provided resources for food, medicines or raw materials for artefact manufacture. This vegetation also supports a variety of animal life associated with the Aboriginal diet. This includes possums, various wallabies and other small marsupials, as well as birds and lizards. In addition, the gullies, creeks and rivers nearby would have provided habitat for swamp wallabies, antechinus, eels, fish and yabbies. The vegetation would have provided a rich and varied food source, as various plant materials, including rhizomes and seeds would have been gathered for sustenance. Acacia seeds provide a rich source of protein and the bark can be used medicinally, and flowers from the *Eucalyptus* provide a rich nectar (Stening 2012: 9).

Bark and wood suitable for spears, shields, water and/or food vessels (coolamons) and other implements would have been available from large trees.

3.5 Current land use and disturbance

Presently the study area is a semi-rural single dwelling property. A single storey red brick house is located in the central portion of the study area. A driveway extends from the front fence to the house and wraps around the house to connect to a carport and shed. Palm trees line the driveway. The property has been cleared and grassed and a few eucalypts are present on the property.
4.0 ARCHAEOLOGICAL CONTEXT

SYDNEY REGION
MARSDEN PARK
THE STUDY AREA
PREDICTIVE MODEL
4.0 ARCHAEOLOGICAL CONTEXT

4.1 Sydney region

The information summarised in this section will facilitate an understanding of Aboriginal site patterning in the region and thereby provide a context within which any sites located in the study area may be archaeologically assessed. It will also assist to determine whether sub-surface sites are likely to exist.

One of the oldest dated occupations for the Sydney region is 15,000 years BP from the Shaws Creek K2 rockshelter on the Nepean River (Kohen 1984; Nanson et al. 1987). The dates obtained by Kohen (1984) and Attenbrow (2003) must be considered in association with environmental data related to sea level rises. The Sydney region that we know today was vastly different to the landscape of 15,000 years ago.

The period of maximum glaciation was 15,000 – 18,000 years BP. Therefore, the date of the K2 rockshelter and Attenbrow’s Darling Mills site indicate that Aboriginal people lived throughout a period of extreme environmental change. During this period, sea levels were up to 130m below current sea levels (Nutley 2006: 1). About 10,000 years ago, as temperatures began rising at the end of the last ice age, the polar ice started melting and sea levels rose. The rising sea levels forced people to abandon coastal sites and move inland, with the result that the oldest coastal sites were inundated.

By about 6,000 years ago, rising water levels had flooded the coastal plain forming the Sydney landscape that we know today. The vast majority of sites in the Sydney region date to around 5,000 years BP, after sea levels had stabilised. Whilst research into submerged indigenous sites is now being undertaken (Nutley 2006), there are few sites in the Sydney area that are known to date beyond 10,000 years BP. Therefore, research undertaken to date has focused on subsistence patterns and cultural change, e.g. Attenbrow (2003).

Many archaeological surveys have been conducted on the Cumberland Plain in relation to Environmental Impact Statements. As a result of these studies, which were occasioned by the burgeoning urban expansion extending onto the Cumberland Plain, the NPWS recognised the need for a coherent study of the area to fully assess the impact of urbanisation on the natural and cultural heritage of the Cumberland Plain. Smith (1989b) was commissioned by the NPWS to undertake an Aboriginal Site Planning Study to be utilised in the management of Aboriginal sites on the Cumberland Plain.

Prior to her study, 307 sites had been recorded on the Cumberland Plain, mainly open artefact scatters (297) with four scarred trees, one carved tree and four axe-grinding grooves and a Mission site (the Blacktown Institute). Smith (1989b:2) added 79 open sites and 29 isolated finds from field surveys related to her study.

Smith’s (1989b:3) analysis indicated that site location and site densities were influenced by the availability of water and raw materials. She concluded that other factors such as topography, natural vegetation and soil types did not influence site location.

Since Smith’s study there has been a dramatic increase in development in Western Sydney resulting in a great deal more archaeological survey and excavation (McDonald 1997). This further work has indicated the complexity in the archaeological record of the area that was not previously recognised. In particular it has been recognised that surface artefact scatters do not represent the full nature and extent of such sites. The potential for sub-surface deposits to remain, despite agricultural disturbance is high whilst sites on permanent water are more complex than sites on ephemeral drainage lines with major confluences being prime site locations.

In 2005 McDonald published the results of excavations in the Rouse Hill Development area, which is south of the present study area. This study refined the model of occupation for the Cumberland Plain. Her study examined site location, stone tool manufacture, mobility, change over time and occupation in relation to stream order. Second and Third Order streams are less likely to contain major sites unless they are at the confluence with another creek or river, which is not the case within the present study area.

McDonald’s 2005a report demonstrates the dynamic nature of stone tool technologies on the Cumberland Plain. She reviewed previous work within a theoretical framework to identify intra and inter-regional variation. She not only identified change over time in the stone tool technology, but the manner in which “stone technologies were organised in relation to landscape” (McDonald 2005a: np). Her report provides a framework to tentatively date sites through technological analyses and to identify cultural changes.
Her study also indicated that the surface representation of a site on the Cumberland Plain does not necessarily reflect the actuality of that site. Of the excavations conducted by her, sub-surface deposits were present even when there was no surface indication of a site. According to McDonald (2005a:5), “despite artefacts being rare or completely absent on the surface at each of the sites investigated, all six sites were found to contain intact archaeological deposit. Almost 500 square metres were excavated during this Project and almost 35,000 artefacts retrieved.” McDonald (2005) also considers that Aboriginal occupation was focussed on the major river systems and characterised by mobility between a small number of sites. As a result of her various studies and applying stream order modelling she (2005) further predicts that the density and complexity of archaeological sites will vary according to stream order, as follows:

- **Fourth-Fifth order creeks (or rivers):** Archaeological evidence will be more complex and possibly stratified, reflecting more permanent and repeated occupation on major creeks.
- **Third order creeks:** Evidence of more frequent occupation such as knapping floors or higher artefact densities will be found in the lower reaches of tributary creeks.
- **Second order creeks:** Sparse archaeological evidence will be found which indicates occasional use and/or occupation.
- **First order creeks:** Due to the intermittent nature of water flow only very sparse evidence would be found in the headwaters of upper tributaries such as background artefact scatter.

Kohen’s studies at Penrith confirmed the importance of fifth order creeks and rivers. He recorded over 50 sites in the Penrith area which included open artefact scatters, axe grinding grooves and rock shelters. Kohen (1997:7) indicates that sites occurring throughout the Penrith area “are particularly likely to occur adjacent to the rivers and creeks. The distribution of raw materials associated with the manufacture of stone tools suggests that chert and basalt were carried or traded east from the river gravels and that silcrete was traded or carried from sources near South Creek and Eastern Creek, west towards the Nepean flood plain”.

Comber (2006 & 2008) also recorded open artefact scatters and scarred trees within the Cumberland Plain. She undertook excavation at two sites at Penrith Lakes known PL9 (2010a) as Camenzulis (2010b) and. At PL9 she retrieved more than 1,500 artefacts, including backed blades and an edge ground axe. Her work confirms McDonald’s (2005) and Kohen’s predictive model that sites are more likely to occur adjacent to the rivers and high order creeks. These excavations (Comber 2010a&b) at Penrith Lakes further indicates the possibility that sub-surface archaeological deposits will remain despite disturbance by non-Aboriginal activities and the complexity of such sites. Surveys (2006 & 2008) undertaken prior to the excavations recorded the areas as being disturbed by agricultural activities. They had been grazed, ploughed, planted with crops and a dam constructed. Only a small number of artefacts were recorded on the surface but over 1,500 artefacts retrieved during excavation.

A survey undertaken by Comber (2008) and subsequent excavations undertaken by Stening (2011) at Doonside demonstrated that although no surface artefacts were recorded (Comber 2008) substantial subsurface deposits did exist on the site with over 1,000 artefacts being recovered from a highly disturbed context (Stening 2011). This site was located beside Eastern Creek an important 4th or 5th order creek. It is an important watershed with extensive evidence of Aboriginal occupation.

Archaeological investigations within the Sydney Basin have established reliable Carbon 14 dating evidence of Aboriginal occupation dating from the Pleistocene but (14,700BP at Cranebrook Terrace). The majority of sites however have been dated to less than 5,000 years. The absence of earlier dates is due to the effect of sea level rises c.6,000 years ago. The influx of seawater over former coastal plains is presumed to have forced people into the new confines of the Sydney Basin (Nutley 2006). This ‘intensification’, or increased population, was then associated with an increase in the physical evidence of post 5,000BP occupation now being recorded through archaeological investigation.

The model of occupation developed for the Cumberland Plain indicates that reliable water is a prime factor in the choosing of site locations by Aboriginal people. More complex higher density sites will be located at the confluence of several water bodies whilst evidence of frequent occupation will be located in the lower reaches of tributaries. However, evidence will still be located in areas with seasonal creeklines, but it will sparse and less complex. Ground disturbance will impact on surface evidence, but subsurface evidence may still be located in areas of high disturbance.

### 4.2 Marsden Park

A search of the OEH’s AHIMS database on 9 September 2016 indicates that there are 15 registered Aboriginal sites within a 2km radius of the study area.

Dr Jo McDonald has undertaken a number of projects in the adjacent suburb of Rouse Hill as described above. These have
included surveys, test excavation and salvage. The Rouse Hill excavation project is the most extensive subsurface program undertaken within the region. She developed the predictive model detailed above as a result of her studies and through synthesising the work of others. She has since reviewed this work (2005b) in consideration of the ongoing archaeological work occurring along Second Ponds Creek and other areas within Rouse Hill. Her review indicates that occupation was initially focussed on the Nepean River and large creek lines such as Shaws Creek, Springwood Creek and Jamisons Creek. Eventually people began to occupy areas further from the major river systems such as the Rouse Hill area. Populations were highly mobile. They transported lithic material from the Nepean River gravels for stone tool manufacture and also used locally sourced lithic material. As sea levels rose and then stabilised after 6,000BP people from the coast were forced inland, increasing inland populations and the pressure on resources. Many new areas were occupied leaving evidence of recent occupation. Heat treatment of the stone became increasingly common and stone was partially worked or prepared at its source and transported to occupation camps. Backed artefacts became more common and in the last 1,000 years ground stone became more common. She suggests that it is possible that changes in the use of raw materials indicates “more restricted social movement and contact via exchange networks” (McDonald 2005b). McDonald’s Rouse Hill Projects from the early 1990’s to the present are a significant contribution to our understanding of Aboriginal occupation on the Cumberland Plain. They also highlight the importance of Rouse Hill and surrounding areas to provide relevant evidence of Aboriginal occupation and lifestyles.

Ongoing studies have contributed to this knowledge and confirm the model of occupation and stone tool use predicated by McDonald. An AHIMS search conducted on 9 September 2016 indicates that there are 15 registered AHIMS sites within a 2km radius of the study area. Table 1 below details these sites and Error! Reference source not found. shows their location. The locations are focussed in the flood plain between South and Eastern Creeks and around Bells Creek. However, it should be noted that the distribution of sites does not indicate the pattern of occupation for the area. Rather they are the result of site selective archaeological surveys undertaken prior to development. No systematic survey has been undertaken of the Box Hill area. All archaeological work has been development driven. Following are details of those sites:

<table>
<thead>
<tr>
<th>AHIMS No.</th>
<th>Location</th>
<th>Site type</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-5-2279</td>
<td>Approximately 1km to the north west of the study area along the eastern fence line facing at 30 Dromana Road.</td>
<td>Open artefact scatter – five red silcrete pieces in poor condition visible in exposure along fence line.</td>
</tr>
<tr>
<td>45-5-0500</td>
<td>Approximately 1.4km to the north east of the study area in an area bound by Carnarvon Road to the east, Burfitt Road to the south and Bells Creek to the north and west.</td>
<td>“Wide scatter of artefacts on tracks across entire area. Includes chert and basalt flakes and a basalt pebble tool. Silcrete is exposed over much of the area, and most of it is not worked or flaked, but many flakes show bulbs of percussion and striking platforms” (AHIMS site card 45-5-0500).</td>
</tr>
<tr>
<td>45-5-4205</td>
<td>Approximately 800m to the south east of the study area on a rise between Bells Creek and Eastern Creek. The western extent of the site is located on South Street approximately 300m east of Fermoy Street. The site extends approximately 400m along the road corridor and is bisected by South Street.</td>
<td>Open artefact scatter: over 50 silcrete artefacts including several cobbles and high quantities of cores. Non-artefactual silcrete gravels were also observed.</td>
</tr>
<tr>
<td>45-5-4206</td>
<td>Approximately 700m to the south east of the study area on the southern side of South Street approximately 125m east of Fermoy Street. The site covers an area of approximately 120 x 50m along the road corridor and extends into an adjacent sports field. The site is located on the lower slope of the ridgeline between Bells and Eastern Creeks.</td>
<td>Open artefact scatter: over 40 red silcrete artefacts protruding from the road verge and in exposed ground at the base of trees.</td>
</tr>
<tr>
<td>45-5-4172</td>
<td>Approximately 1km to the north west of the study area in an exposure adjacent to the eastern side of Richmond Road approximately 70m south of the intersection with Garfield Road West.</td>
<td>Open artefact scatter and subsurface deposit: artefacts were visible on the ground surface and in cuttings for the installation of services within the road reserve. Archaeological salvage excavations were...</td>
</tr>
<tr>
<td>AHIMS No.</td>
<td>Location</td>
<td>Site type</td>
</tr>
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<td>----------</td>
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</tr>
<tr>
<td>45-5-4173</td>
<td>Approximately 1km to the north west of the study area on an upper slope on the northern side of Richmond Road at the junction with Garfield Road West within the road verge.</td>
<td>Undertaken and 40m² was excavated and approximately 5000 predominantly silcrete artefacts were uncovered. Silcrete cobbles and in situ knapping floors were excavated.</td>
</tr>
<tr>
<td>45-5-4174</td>
<td>Approximately 50m to the north of the study area, the site is located on the upper slope and crest of a rise that has been bisected by Vine Street West. Artefacts were identified within the road corridor on both the northern and southern sides of Vine Street West.</td>
<td>Open artefact scatter and subsurface deposit: an artefact scatter measuring approximately 30 x 40m comprising a core, core fragment, flake and angular fragments all made of silcrete was recorded within the road verge. Archaeological salvage excavations were undertaken and a total of 68m² was excavated uncovering more than 50 artefacts made of silcrete, petrified wood and quartz. Flakes and silcrete cobbles were uncovered.</td>
</tr>
<tr>
<td>45-5-4175</td>
<td>Approximately 700m to the north west of the present study area on the southern side of Vine Street West approximately 20m from the junction with Richmond Road.</td>
<td>Open artefact scatter: two silcrete cores and a silcrete flake were recorded within a cut in the natural ground surface on the northern side of the road and an exposure due to an ant’s nest on the southern side.</td>
</tr>
<tr>
<td>45-5-4176</td>
<td>Approximately 500m north west of the present study area in an exposure on the south side of Vine Street West, approximately 390m east of the junction with Richmond Road. The site is located on the mid slope of a rise between Bells Creek and Richmond Road.</td>
<td>Isolated find: a pink silcrete core was located in an exposure on the ground.</td>
</tr>
<tr>
<td>45-5-4177</td>
<td>Approximately 300m to the north east of the present study area on the northern side of Grange Avenue within the road reserve approximately 700m east of the intersection of Grange Avenue ad Richmond Road. The site is located on a lower slope rising westward from Bells Creek.</td>
<td>Open artefact scatter: comprising two flakes, two angular flakes and a split flake all comprised of silcrete.</td>
</tr>
<tr>
<td>45-5-4178</td>
<td>Approximately 250m to the north west of the present study area within an exposure on the northern side of Grange Avenue, approximately 150m east of the intersection with Richmond Road.</td>
<td>Isolated find: a silcrete proximal flake fragment.</td>
</tr>
<tr>
<td>45-5-4198</td>
<td>Approximately 300m to the south of the present study area on the southern side of South Street, approximately 200m east of the intersection with Richmond Road. The site is located on a slope that rises westward from Bells Creek.</td>
<td>Open artefact scatter: two artefacts were observed providing site dimensions of approximately 45m x 15m. The artefacts comprised a silcrete core and a mudstone.</td>
</tr>
</tbody>
</table>
ABORIGINAL DUE DILIGENCE ASSESSMENT

<table>
<thead>
<tr>
<th>AHIMS No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>45-5-4199</td>
<td>Approximately 300m to the south east of the present study area on the southern side of South Street, approximately 300m east of the intersection with Richmond Road. The site is located adjacent to the driveway of 143 South Street on a slope descending eastward to the open depression of Bells Creek.</td>
<td>Isolated find: a single red silcrete flake was identified in a 3m x 1m area of ground exposure.</td>
</tr>
<tr>
<td>45-5-4305</td>
<td>Approximately 500m south of the present study area in an area approximately 100m east of Richmond Road and 200m south of South Street. The site was located in a drainage depression below a slope.</td>
<td>Isolated find: uncovered during archaeological test excavations in a 1m x 1m test trench within the top 10cm.</td>
</tr>
<tr>
<td>45-5-4444</td>
<td>Approximately 1.6m north west of the present study area within a portion of land on the western side of Park Road. The site is located approximately 70m south west of the corner of Barton Street and Park Road. The site is located on an elevated area on the ridge at the junction of South and Eastern Creeks.</td>
<td>Open artefact scatter: 15 silcrete artefacts were recorded across an area measuring approximately 80m x 40m. A large number of silcrete cobbles and fragments were also observed on the ground surface. “The deposit is part of a large exposure of silcrete extruding from a deflationary ridge top” (AHIMS Site card 45-5-4444).</td>
</tr>
</tbody>
</table>

Table 1: Details of registered Aboriginal sites

Figure 5: Showing the location of registered Aboriginal sites within the vicinity of the present study area (map courtesy of Google Earth)
Archaeological excavation within the immediate vicinity of the study area was undertaken at AHIMS 45-5-4172, 45-5-4173 and 45-5-4175. Excavations at AHIMS 45-5-4172 revealed 5,000 artefacts from a total of 40m² of excavation, giving an average artefact density of approximately 125 artefacts per m². AHIMS site 45-5-4173 revealed 50 artefacts from an area of 68m² giving an average artefact density of approximately 0.73 artefacts per m². Both of these sites are located approximately 400m from an unnamed tributary of South Creek. AHIMS 45-5-4174 is located approximately 85m from an unnamed tributary of South Creek and revealed a “number of artefacts” (AHIMS Site Card 45-5-4174). These sites are located in a similar environmental context to the present study area, i.e. close to an unnamed tributary of South Creek, a first order stream, and in the floodplain between South and Eastern Creeks, to third order streams, and approximately 400m to the south west of Bells Creek, a second order stream, and in areas subjected to European land use and disturbance.

These sites confirm the model of occupation and site location developed by McDonald. These sites are all located around unnamed tributaries of the South Creek, first order streams. The sites are located in the floodplain between two third order streams, South and Eastern Creeks, and close to Bells Creek, a second order stream. These sites are located within an area that would have once been a significant cultural landscape. The location between these large streams provides a well watered fertile landscape that would have provided plentiful resources. The presence of silcrete cobbles eroding from the ridgeline indicates that the area may have been rich in silcrete deposits, providing a good source of raw materials for the manufacture of stone tools.

4.3 The Study Area

The AHIMS search conducted on 9 September 2016 indicates that there are no known sites recorded on the subject property.

4.4 Predictive model

On the basis of the environmental and archaeological information that has been conducted within the Sydney Basin and Marsden Park, it could be predicted that the study area contains archaeological potential. It is located between two third order creeks and located approximately 400m south west of a second order creek. It is also located 600m from a first order stream. Fifteen known sites are located within only a 2km radius of the study area. The site types that could be expected would be:

1. Artefact scatters
   These sites are characterised by surface or sub-surface scatters of stone artefacts or artefacts embedded in deposits.

2. Isolated finds
   Single artefacts which may be the result of tool loss, abandonment or maintenance may be found. They may also be indicators of otherwise buried sites or the only remains of heavily disturbed sites.

Scarred or carved trees are not expected as the property has previously been cleared. Similarly, rock shelters, paintings, engravings or axe grinding grooves are not expected, as the study area does not contain rock outcrops suitable for such site types.

In addition, it is highly likely that subsurface deposits exist on the property. The background research for the Cumberland Plain and Marsden Park indicates that subsurface archaeological deposits, yielding large numbers of artefacts exist, despite only a low density or no artefacts being located on the surface.
5.0 RESULTS
5.0 RESULTS

No known sites were previously recorded on OEH’s Aboriginal Heritage Information Management System, as there has not previously been an assessment of the subject property.

During the assessment the ground visibility was nil as the area was heavily vegetated and contained a residence with outbuildings. Although the whole of the study area was examined, due to the heavy vegetation, no Aboriginal objects were located during the site inspection. However, previous archaeological work on the Cumberland Plain has indicated that subsurface deposits will still exist despite a lack of surface evidence and even if the ground has been disturbed by agricultural or other development impacts.

The study area is located within an area of archaeological sensitivity. It is located only 400m from Bells Creek and between two third order streams, South and Eastern Creeks and known sites are located within the vicinity of the study area. The predictive model developed by McDonald for the Cumberland Plain indicates that it is highly likely that subsurface archaeological deposits will exist on the property.

In addition, OEH’s Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales details the archaeological importance of certain landscape features, including a water source. The Due Diligence guidelines state that if the proposed activity is “within 200m of waters” then there may be a need to apply for an Aboriginal Heritage Impact Permit (AHIP), particularly if the background research indicates the likelihood of Aboriginal objects existing on the property.

Prior to applying for an AHIP, archaeological testing in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales is required to determine if Aboriginal objects are on the property and, if so, their nature and extent. Once the testing has been completed, if Aboriginal objects have been located, an AHIP will be required.
6.0 LEGISLATION

NATIONAL PARKS AND WILDLIFE ACT 1974
6.0 LEGISLATION

National Parks & Wildlife Act 1974

The National Parks & Wildlife Act 1974 (NPW Act) provides statutory protection to all Aboriginal sites within New South Wales. The Office of Environment & Heritage (OEH) is the State Government agency responsible for the implementation and management of this Act.

Part 6 of the National Parks & Wildlife Act provides for the protection of all Aboriginal “objects” which are defined as:

Any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.

In particular, Part 6 of the Act states that it is an offence to harm or desecrate an Aboriginal object or Aboriginal place, without an Aboriginal Heritage Impact Permit (AHIP).

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales and The Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales indicate that if there is the possibility for Aboriginal objects to exist on the property that subsurface archaeological testing must be undertaken in consultation with the relevant Aboriginal stakeholders to determine the nature and extent of the deposit, prior to applying for an AHIP.

Therefore, as the subject property is within an area of archaeological sensitivity with high potential to contain Aboriginal objects the following must be undertaken:

- Aboriginal consultation must be undertaken in accordance with OEH’s Aboriginal cultural heritage consultation requirements for proponents 2010 prior to archaeological testing (approximately 4 months).

- Once the consultation has been undertaken, archaeological testing must be undertaken to determine the nature and extent of sites on the property and to determine whether the proposed development will adversely impact upon Aboriginal “objects”. This testing must be undertaken in accordance with OEH’s Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW. (approximately 2-4 weeks)

- If no Aboriginal objects are uncovered during the testing the redevelopment of the site can proceed without an AHIP.

- If Aboriginal objects are uncovered during the testing it will be necessary to apply for an AHIP with salvage and undertake salvage excavations to remove the remainder of the site. OEH have a service guarantee to issue an AHIP within eight weeks of the receipt of all information.

Undertaking the consultation, testing and obtaining an AHIP can take a minimum of 7 months but can take as long as 12 months.
7.0 RECOMMENDATIONS
7.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- Legal requirements under the terms of the *National Parks & Wildlife Act 1974* (as amended) which states that it is an offence to harm or desecrate an Aboriginal object without first gaining the consent of the Director General of the Office of Environment & Heritage.

- Research into the Aboriginal archaeological record for the study area

- Results of the site inspection and assessment as outlined in this report which conclude that there is a high likelihood that subsurface archaeological deposits will exist on this site.

**IT IS THEREFORE RECOMMENDED THAT:**

1. Aboriginal consultation should be undertaken in accordance with OEH’s *Aboriginal cultural heritage consultation requirements for proponents 2010*.

2. Archaeological testing should be undertaken to determine the nature and extent of Aboriginal objects on the subject property. A Research Design which clearly outlines the proposed methodology for the testing will need to be prepared in consultation with the Aboriginal community and submitted to OEH 14 days prior to the testing being undertaken.

3. If no Aboriginal objects are found during the archaeological testing the proposed redevelopment can proceed without an AHIP; or

4. If Aboriginal objects are found during the archaeological testing it will be necessary to apply for an AHIP.
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PHOTOGRAPHS
| Figure 6: | Facing east.  
Grange Avenue looking across the front of study area. |
| --- | --- |
| Figure 7: | Facing south.  
Front entrance from Grange Avenue to study area, driveway and palm trees, with house in background. |
| Figure 8: | Facing north.  
Western edge of study area marked by fence and view from house to entrance. |
Figure 9:
Facing north east.
Front yard of study area.

Figure 10:
Facing east.
Front yard of study area.

Figure 11:
Facing south.
Rear yard of study area from south east corner of house.
Figure 12:
Facing north west.
From south east corner of house looking at shed on the eastern edge of study area.

Figure 13:
Facing south.
Looking along the eastern side of the property. A small garden bed and trees against the boundary fence.

Figure 14:
Facing south east.
Looking outside the southern boundary fence of study area into adjacent property. The area is wet into the corner of the study area and several dams are located south of the study area.
**Figure 15:**
Facing west.
Southern boundary fence and trees.

**Figure 16:**
Facing south.
Looking south along the western edge of the study area in the rear of the property.

**Figure 17:**
Facing north.
Looking north along the western edge of the study area.
APPENDIX A

DEVELOPMENT PLANS
APPENDIX B

AHIMS EXTENSIVE SEARCH
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GLOSSARY
GLOSSARY

Adze: an axe like bifacial tool with a bevelled bit or blade edge usually used to work wood, or sometimes to dig for root crops.

Alluvium: material which is transported by a river and deposited at points along the flood plain of the river.

Artefact: any object made by human agency. All lithic tools and lithic debitage are considered artefacts.

Artefact scatter: also known as a surface scatter or open site, where prehistoric material such as artefacts and waste debris are lying exposed on the surface of the ground.

Assemblage: a collection of artefacts from an archaeological site.

Australian small tool tradition: a mid Holocene tool industry of the Australian Aborigines that appeared about 5,000 years ago when a new ensemble of small, flaked stone tools began to come into use. The types consisted of backed blades and flakes, Unifacial and bifacial points, and small adze flakes. There are some regional distributions of tools, including Bondi points, geometric microliths, Pirri points and Tula adzes.

Axe: a stone artefact that has been ground on one or more sides to produce a sharp edge.

Backed blade: a blade flake that has been abruptly retouched along one or more margins opposite an acute (sharp) edge. Backed pieces include backed blades and geometric microliths. They are thought to have been hafted onto wooden handles to produce composite cutting tools or spears. Backed blades are a feature of the “Australian small tool tradition”, dating from between 5,000 and 1,000 years ago in south eastern Australia (Mulvaney 1975).

Bifacial flaking or retouch: when flakes have been removed from two opposing faces.

Biomantle: the upper part of soil produced by biodynamical agents and processes of which bioturbation is normally hierarchically dominant. By definition, it contains at least 50% biofabric, a condition met in essentially all topsoils.

Bioturbation: the alteration of a site by non-human agency, e.g. burrowing animals, tree and grass roots, insects

Blade: a flake that is at least twice as long as it is wide.

Bondi point: a small, asymmetric backed point, named after Bondi Beach where it was first found, which is a component of the Australian small tool tradition. It is usually less than 5cm long and is sometimes described as a backed blade.

Broad platform flake: a flake which has a platform which is as wide as, or wider than, the body of the flake.

Bulb of percussion: a rounded bulge where the force from the hammerstone has radiated through the stone and split it from the core.

Burin: a flake tool that was produced by the removal of two flakes at right angles to one another to produce a very fine sharp and durable edge.

Carved trees: trees which have had designs carved into the bark or heartwood and in some areas may have been used to mark burial or initiation sites.

Chert: a very fine crystalline aggregate of silica.

Context: the time and space setting of an artefact, feature or culture. The context of a find is its position on a site, its relationship through association with other artefacts, and its chronological position as revealed through stratigraphy. An artefact’s context usually consists of its immediate matrix (the material surrounding it, e.g. clay, gravel or sand), its provenience (horizontal and vertical position within the matrix), and its association with other artefacts (ocurrence together with other archaeological remains, usually in the same matrix). The assessment of context includes study of what has happened to the find since it was deposited.
Core: a piece of stone bearing one or more negative (concave) flake scars. A stone which has obviously had flakes and flaked pieces struck from it.

Cortex: refers to the original weathered outer surface of the rock used to manufacture an artefact.

Debitage (debris): detached pieces that are discarded during the reduction process.

Distal end: the end opposite to the platform or the point end of a blade.

Dorsal surface: the ‘back’ of the artefact or the side that was once part of the outside of the core or shows evidence of previous flake removals.

Edge-ground artefact: an artefact (generally an axe or adze) whose cutting edges have been ground, rather than flaked, to form a sharp edge.

Eraillure scar: the small flake scar on the dorsal side of a flake next to the platform. It is the result of rebounding force during percussion flaking.

Erosion: the wearing away or loosening and transportation of soil or rock by water, wind and ice.

Fabricator: a stone or bone artefact used in the manufacture of other tools. Often rod shaped and worn heavily on one end, it is used to chip flakes from a core, or to retouch a flake.

Flake: any piece of stone removed from a larger mass (core) by application of force (percussion), and having a striking platform and bulb of percussion.

Flaked piece: any stone struck from a larger mass by percussion but not containing all or any of the characteristics of a flake.

Focal platform flake: a flake which has a platform narrower than the body of the flake.

Grinding groove: a depression resulting from the sharpening of stone tools such as axes and adzes, usually located on surfaces of fine homogenous sandstone and near water.

Grinding stone: a thick stone used as a mortar for grinding seeds, roots, tubers, or ochre.

Hammerstone: the stone that is used to remove flakes from the core.

Holocene: that portion of geologic time that postdates the latest episode of continental glaciation. The Holocene Epoch is synonymous with the recent or postglacial interval of Earth's geologic history and extends from 10,000 years ago to the present day. It was preceded by the Pleistocene Epoch and is part of the Quaternary Period, a time characterised by dramatic climatic oscillations from warm (interglacial) to cold (glacial) conditions that began about 1.6 million years ago. The term Holocene is also applied to the sediments, processes, events, and environments of the epoch.

Horizon (or soil horizon): the layers of the upper crust of the earth. The top, or O, horizon is the layer of undecomposed litter; the A horizon is topsoil, where most roots grow; B is the subsoil; and C is the parent rock material, broken into chunks. Although some roots can penetrate into the C horizon, few microorganisms live there.

Isolated find: a single stone artefact found on the surface of the land not in association with any other artefact.

Knapping: the process of hitting one stone (core) with another (hammerstone) to produce a flaked artefact.

Lamellate flaked piece: thin and wedge shaped, similar to a flake, but without the diagnostic features of a flake. A lamellate may by the distal end of a flake which has had its platform broken off.

Lithic: anything made of stone. Derived from the Greek word meaning stone or anything pertaining to stone.

Manuport: piece of stone intended to be, or used as, a core that has been carried to the area from somewhere else.
Microlith: a small (1 – 3cm long) flake with evidence of retouch. Bondi points, scrapers and backed blades are all types of microliths.

Midden: a prehistoric refuse site chiefly composed of shell fragments.

Multidirectional core: a lithic mass (core) with evidence of flaking originating from more than one direction and with more than a single striking platform.

Negative flake scar: the scar left by the removal of a flake. The scar may also show a rounded depression which is the negative of the bulb of percussion.

Open site: also known as a surface or artefact scatter, where prehistoric material such as artefacts and waste debris are lying exposed on the surface of the ground.

Pirri point: a symmetrical leaf-shaped point, up to 7cm long, unifacially flaked all over its dorsal surface. The striking platform and bulb of percussion are sometimes removed to produce a rounded, thinned butt. Pirri points are a component of the Australian small tool tradition, found generally in inland Australia. The term pirri is an Aboriginal word for ‘wood engraving tool’.

Platform: the flat surface which receives percussion or pressure in the removal of a flake or flaked piece.

Pleistocene: a geochronological division of geological time, an epoch of the Quaternary period following the Pliocene. During the Pleistocene, large areas of the northern hemisphere were covered with ice and there were successive glacial advances and retreats. The lower Pleistocene began about 1.8 million years ago; the Middle Pleistocene about 730,000 years ago; and the Upper Pleistocene about 127,000 years ago; it ended about 10,000 years ago. The Pleistocene was succeeded by the Holocene.

Potential archaeological deposit (PAD): any location considered to have a moderate to high potential for subsurface archaeological material.

Potlid: small circular piece of stone that has literally “popped off” the surface of the artefact due to exposure to extreme heat.

Proximal end: the ‘top’ of the artefact, or the part that the knapper hit to remove it from the core, where the platform is expected to be.

Quarry: a location from which stone has been extracted in order to make stone artefacts.

Retouch: refers to the secondary working of an artefact after it has been struck from the core. Retouch is used to sharpen the edges. It is the intentional modification of a stone tool edge by either pressure or percussion flaking techniques.

Scarred trees: trees from which bark has been removed for the manufacture of everyday items such as containers, canoes or shields.

Scraper: a generalised term used to describe a flake tool that has a retouched edge angle of approximately 60 to 90 degrees.

Silcrete: silica-silica-rich duricrust identified by the presence of complete granules or even pebbles within the matrix.

Stratigraphy: the study and interpretation of the stratification of rocks, sediments, soils, or cultural debris, based on the principle that the lowest layer is the oldest and the uppermost layer is the youngest. The sequence of deposition can be assessed by a study of the relationships of different layers.

Taphonomy: Literally, ‘the laws of burial’. In archaeology, it is the study of the processes by which archaeological remains are transformed by human and natural processes during their incorporation into archaeological deposits, their subsequent long-term preservation within those deposits, and their recovery by archaeologists. The aim is to understand the processes resulting in the archaeological record.

Thumnail scraper: a small flake with a convex scraper edge, shaped like a thumbnail and located opposite the flake’s platform. They exhibit unifacial retouch (usually on the ventral surface) and are usually less than 30mm in length.

Transect: an arbitrary sample unit which is a linear corridor of uniform specified width. A straight line or narrow sections through an
archaeological site, along which a series of observations or measurements is made.

**Tuff**: a rock formed of volcanic fragments (generally ash).

**Typology**: a scheme to order multiple types in a relational manner. A common typology orders types in a hierarchical manner.

**Unidirectional core**: a core with only one striking platform surface and with flake scars extending in only one direction.

**Unifacial flaking or retouch**: where flakes have been removed from one face only.

**Use-wear**: the physical changes to the edges of an artefact as a result of its use. Modification of a tool resulting from its use.

**Ventral surface**: the ‘front’ of the artefact, or the side that was once part of the interior of the core.